COVER SHEET

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E-Learning: The Quest for Effectiveness

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Abstract

This paper seeks to present the merits of numerous studies by conducting a review of literature available online. It discusses some of the means of effectively evaluating, designing and managing e-Learning programmes and hopes to accurately envisage what the future may hold for the development of online education. Despite the ample support and enthusiasm for virtual models of learning from both the corporate and educational arenas, the effectiveness of e-Learning is by no means a sure thing. Successful e-Learning programmes require specific conditions and constant monitoring and a lot more research has yet to be done before an acceptable universal model can be developed.

E-LEARNING: THE NEED FOR EFFECTIVENESS

The incredible number of published web articles, institutional investments in e-learning and uptake of Web-based education tools in both corporate and education sectors in the past decade testifies that e-Learning practice has achieved an enormous momentum and will make a tremendous impact – positive or negative – on future education. As highlighted by analyst Cappelli (2003; p.41) universities and other post-secondary institutions are far from being characterised by the 'idealistic notion of operating outside the daily financial grind of revenues, expenses and budgets'. The tertiary education sector is today a complex business and like others is cost-sensitive and eager to utilise the latest technologies to help streamline its operations. With this in mind, many educators have turned to online e-Learning in hopes of incorporating a more cost-effective means of education. Contrary to popular opinion however, e-Learning can often lead to a rise in costs; in the short term at least. Nevertheless online e-Learning does help widen the scope of education and can prove to be a vital asset, provided of course it is *'effective'*.

This concept of effective e-Learning may take years of development and evaluation to fulfil; a notion which sometimes eludes even the most reputable of online educators. It is an issue which plagues both the corporate and education fields and which is frequently aggravated by the numerous, often contradictory studies on the subject. This paper will seek to yield the merits of these studies by conducting a review of literature available online, in order to decipher some of the better means of effectively evaluating, designing and managing e-Learning programmes in hopes to accurately envisage what the future may hold for the development of online education.

EVALUATING EFFECTIVENESS

The development and use of any e-Learning programme or strategy represents an individual, organisational and social investment. For this reason, the effectiveness of e-

learning should be evaluated. Without knowing the efficacy of e-learning strategies one cannot know the value of their use. Measuring effectiveness can constitute a useful tool to base decisions on the use of any e-Learning strategy (Figueira, 2003).

In Shank's article "Showing the Value of e-Learning" (2003) she refers to methods by which to evaluate the effectiveness of external e-learning training programmes. Her research lists the more popular criteria for evaluation and the means in which these criteria can be assessed. Data from her study cites 'learning gains' as the primary measure of effectiveness in regards to student performance; a measure best equated by examination and test scores. Course completion rates, on the other hand, provide an overall indication of course-success in respect to student demand whilst customer satisfaction surveys, both immediately and delayed, can offer useful guidance on the strengths and weaknesses of a programme.

A study of similar interest by Figueira (2003), although more geared towards internal e-Learning programmes for businesses, also provides valuable suggestions regarding methods of assessment. His research includes a list of approaches catering to the different reasons for course assessment and encompasses a concise summary of the more suitable methods by which to meet the goals behind each motive.

The gist of these, the 'programme-goal' model, focuses on the meeting of course initiatives which can be gauged using several means including quantitative research, experimental design and before/after testing. This approach should be contrasted with the '(G)oal-free model which focuses more on value and involves both quantitative as well as qualitative assessment. Also worth noting is the 'Expert' model, an evaluation based on the opinions of external professionals in the field. The methodology of this approach incorporates the use of critical revisions based on experience and subjective commentary from experts within the corresponding business sector related to the area of study. Despite the heavy corporate emphasis, many parallels can be drawn between Figueira's methods and those currently in practice in the education sector.

Canada's Grant McEwan College has released a set of evaluation guidelines which touches on this point and which, among other things, stresses the importance of evaluating the meeting of course objectives when launching and running e-Learning programmes (Wright, 2004). In addition to this, an emphasis on quality is also recommended; thus highlighting the need for key elements such as good accessibility, straightforward organisation of material, engaging language as well as clear and detailed expectation directives, to name a few. This echoes the propositions of a recent study by Berk (2003) which, like Wright's article, propounds the importance of focusing on 'how well you train rather than how much you train' (p.1). Berk highlights the danger of over-emphasising quantitative measures and the importance of using qualitative learner management systems to gauge training impact, which contrary to common belief, can be developed in a cost-effective manner by leveraging on existing technology and incorporating basic tools such as database software to automatically compile training and revenue data for comparison (p.4). The study also suggests attaining both learner and management opinions through surveys and questionnaires to provide an indication of whether course material is of satisfactory quality to help meet student needs. Such qualitative information can be of great value to e-Learning providers in both business and educational environments but are often not taken seriously.

Educators and business training managers alike have strived to try and remedy this dilemma. Sonwalkar (2001) claims to offer a legitimate solution to the issue through the allocation of ratings to online courses using a detailed scoring system based on the scope of course provisions. Ratings are calculated in terms three categories each of which receives an allocated weighting towards the final score. The Media category, for example, lists different forms of content formats such as text, graphics and video, each of which receive a point if included in the course provisions. Points for all the three categories - Style, Media and Interaction – and their corresponding sub-categories are then consolidated to assign the course with what's referred to as a Pedagogical Index Effectiveness (PEI) rating, an entirely objectively generated value.

Of course this alone may not be a completely effective means of selecting the best course. Subjective opinions, such as those discussed above, are of value and have thus been incorporated into the second limb of Sonwalkar's method. This involves the incorporation of an additional rating compiled from an allocation of qualitative scores ranging from zero to four, four being excellent, of several categories including content factors, learning factors and various others. These are then amalgamated into a "Summative Rating" which is then multiplied by the PEI rating to produce a final score. The system despite its complexity, if universally applied, does seem to offer a potentially effective means of comprehensive evaluation and is perhaps worth considering.

Whether or not Sonwalkar's methods are eventually adopted, it is of little doubt that an appropriate solution to help quell the growing need for a standardised and proven evaluation scale is of mounting concern in the education sector given the rapidly increasing pace at which online programmes are being launched. An estimated 84 percent of two-and four-year colleges in the United States alone offered at least some form of distance learning course in 2002, a large proportion of which were internet-based. (Bonk, 2002).

Businesses in their usual highly price-sensitive nature have been swift to respond to this need and have been responsible for pioneering some of the leading new developments in this area. Many of these methods have been rejected by Islam (2004) who offer alternative strategies with a greater emphasis on valuations. He suggests incorporating proven business-specific tools such as Total Quality Management (TQM) and Software Development Life Cycle approaches rather than the conventional methods usually associated with the training and education field (loc cit). In particular he recommends applying the renowned Six Sigma model, an approach often associated with the notable Jack Welch and the resurgence of General Electric (Welch, 2001). The model's five-step mechanism - define, measure, analyse, improve and control – is described as a procedure that is better integrated with business requirements and one which, although not as quality orientated, can provide a valuable solution in addressing the need for course evaluation in budget-strained conditions.

The use of such models have been part of a growing impetus in the education field which, aside from budgetary constraints, also tends to suffer from political pressure to demonstrate efficiency and responsiveness (Mohamed, 2004; p.388). The TQM method, a much more quality-orientated approach has long been a key component of many higher-education models despite the questionable desirability of implementing what are seen as largely uniformed principles to the dynamic and heterogeneous environment of higher

education (loc cit; p.387). This one-size-fits-all approach is perhaps the greatest drawback of business models.

Schank, (2002) seems to have cornered the more successful elements of such models. He begins by highlighting an important notion often overlooked when it comes to evaluation; that of time. Over-emphasis on fixed times and schedules, an element which has long been associated with traditional teaching methods since the development of basic economies of scale, is a limiting factor which plagues even the best of programmes. Students, it has long been known, learn at different rates yet despite the development of various new and innovative learning platforms, educators are all too often drawn to 'making new e-Learning systems look just like the old training that they are intended to replace' (ibid; p.73). Programmes which fall short of utilising online e-Learning to remedy this setback may arguably be deemed as lacking in effectiveness as they have essentially failed to realise the full benefits of the new technology.

Using the acronym FREEDOM, Schank (2002) suggests seven means by which to assess an e-Learning programme. The first of these, Failure, helps the student learn from his/her mistakes; an important element in any learning programme. Reasoning, the second measure, is also seen as a significant element particularly in regards to encouraging practice in deliberating decisions which, along with his fifth measure, Doing, should involve the provision of training for students to apply their knowledge in real-life situations. Emotionality and Exploration meanwhile help provide a more engaging environment for learners by allowing them to form an emotional link to material while also having the option to inquire or further discuss a topic. All materials of course should be presented in a user-friendly format and supported with the opportunity for Observation, measure number six, which includes the provision of diagrams charts and other visual aids. Of course however, it goes without saying that the riches above would be useless without proper Motivation, the final measure which should manage to somehow provide the student with a feeling of being able to personally relate to the material and its value.

Schank's methods, although being rather clear cut, are only a few suggestions of many on the topic of evaluation. A study by Olds (2004) suggests that the best approach to deciding what evaluation means is to begin by exploring a range of methods and then deciding at a later point which of these methods best meets programme goals. Other studies meanwhile suggest triangulating several techniques at the same time to help cover more ground (Olds, 2004). Whatever the approach, the bottom line is that there is unlikely to be one absolute method and, with this in mind, training managers and educators should perhaps focus on what's best suited and feasible rather than what's most credibly acclaimed.

PROBLEMS REGARDING EFFECTIVENESS

E-Learning has yet to garner complete acceptance from the educational and business community. Needless to say it is a concept that is often shrouded in scepticism by members from both the academic and corporate fields who are often incredulous of its effectiveness and practicability. A large degree of this suspicion can be attributed to the often highly substantial costs associated with online programmes, particularly at the development stage.

Students, governments, educators and corporations today expect e-Learning to be an affordable and comprehensive learning method; an ambition that appears to have been largely unmet. Course providers, particularly from the education sector, have often left many asking "why is there no learning in e-Learning" (Bonk, 2002); but more precisely, what is it that prevents e-Learning from being on par with face-to-face learning?

The most obvious shortcoming in this regard is the focus on emulating the classroom environment. There is tendency amongst course designers to try and make e-Learning 'look and feel like face-to-face learning' (Schank, 2002). This may ironically be the very reason behind the lack of effectiveness (Mohamed, 2004; p.385). Adding to this is a recent study led by Indiana University which identifies overwhelming tasks, confusion, poor justification and excessive data as some of the other problems further compounding the lack of effectiveness (Bonk, 2002). Other matters for concern meanwhile include poor pedagogy, inferior online tools, unmotivated students and instructors, poor research and measurement and the mismatching of vendor/administrator visions.

Schank (2002) asserts that effective learning for students must constitute 'doing a task they care about, failing, and redoing it until they get it right' (p.108). He views this as a crucial requirement for any learning programme and the lack of it a cause for concern. Mere audio recordings, slide-shows and other visual stimuli make for a shoddy replacement for fundamental learning tools.

This of course relates to the bigger issue regarding a failure amongst course developers in ensuring adequate integration of learning content with real-life situations; a matter of great anxiety considering the research in this area which, among other things, purports the important notion that 'principles and ideas learned in one domain are almost never transferred to another arena' (Schank, 2002; p.108). Students are often left incapable of applying the skills learned during a course directly to the workplace.

Ritzel (2002) attributes part of the problem to the failure on the part of the education system to adapt from providing for a largely manual-labour orientated economy to what has today become a more intellectual-based society; a change which has been further complicated, some may say, by an equally significant paradigm shift in technology. He refers to this shift as the 'e-Learning fad' and expounded the view that many online courses were largely ineffective from the very onset, because course designers themselves were mostly information technology and Internet specialists and for them, training programs were just like any other content. They merely took whatever they found (or were given) and enabled it on the Net without even possibility considering the use of creative and innovative opportunities for new interactive learning experiences.

Ritzel's view propounds those of other experts in the field, such as Schank, (2002) who feel that e-Learning should one day, by capitalising on innovative delivery means and graphic and audio capabilities, offer a completely new method of learning unlike that of any classroom; a focus that has led both businesses and educators to acquire a new perspective on e-Learning and exercise greater restraint in 'jumping into e-Learning with both feet' (Goodridge, 2002). This newfound caution however, although widespread among experts, has nevertheless done little to stem the continual launching of ineffective and unsuccessful programmes.

Students it seems have yet to be convinced of the benefits or even the adequacy of online instruction; an issue which more frequently plagues the older generation and one which can often be a common setback for business e-Learning programmes, particularly in organisations where 'student demographics and psychographics may predispose them against using computers at all, let alone for e-learning' (Kurse, 2004a). This relates back to the underlying problem of poor motivation which, as identified by Bonk (2002) today makes for one of the major stumbling blocks of online education. Kurse (2004a) states that "without a desire to learn on the part of the student, retention is unlikely…Many students in a corporate setting who are forced to complete training programs are motivated only to 'pass the test.' Designers must strive to create a deeper motivation in learners for them to learn new skills and transfer those skills back into the work environment" (Kurse, 2004b). This need for a greater emphasis on providing engaging, more student-orientated material seems to be largely understated as far as design models are concerned.

This is not to suggest of course that all e-Learning developments have been unsuccessful. Several institutions do manage to provide highly effective programmes, the most notable perhaps being the University of Phoenix which, as far as revenue is concerned, makes for one of the great success stories of the industry. On the corporate side meanwhile, a number of organisations particularly in the high-tech sector have also been successful.

Despite these successes however, e-Learning is, no doubt, still in its infancy with many significant developments yet to come. The mistakes of the past have taught us important lessons; lessons that must be learned. Further analysis and study will help meet this objective and will hopefully assist course designers in developing a programme that may one day parallel or even surpass traditional classroom training.

DESIGNING AN EFFECTIVE PROGRAMME

There is no one-size-fits-all approach to e-Learning programme development. Different courses seek different objectives while different student demographics and environments bring with them their own unique setbacks and challenges. Important breakthroughs and developments regarding the best means of conquering these obstacles have been made in both the corporate and education sector, many of which have been touched on in the preceding sections.

Schank (2002) already noted for his 'FREEDOM' assessment technique, has put forward a series of guidelines regarding what he feels characterises adequate design and delivery of effective online courses. His recommendations, although geared towards corporate programmes, provide valuable guidance for both educators and training managers alike. His study emphasises the importance of ensuring that course material provokes an emotional response from the student; an element which many programmes appear to lack. Stimulus, he suggests, must be as realistic as possible to avoid the memory classifying the experience as an ordinary fabrication that will unlikely be retained.

In addition to this, Schank also stresses the importance of timing in learning systems. He recommends providing students with just-in-time fashioned training as opposed to adhering to fixed schedules. This allows trainees to hone in on skills shortly after making a mistake or just prior to utilising their newfound abilities; a view which characterises

Schank's ongoing campaign to distinguish e-Learning from traditional educational models often criticised for their lack of flexibility.

This perspective of allowing students to learn from their own mistakes and at their own pace makes for a vital element of any course according to Schank (2002) who stresses that students will always teach themselves better than the world's best trainers or highest-paid motivational speaker. For him '(G)ood e-Learning allows a learner to be his or her own teacher'.

Despite the emphasis on ensuring a personalised learning experience however, and perhaps contrary to common belief, Schank professes that students do in fact not have different learning styles, but merely different learning personalities. An effective programme, in his view, must 'present the learner with options that allow the learner to learn in his or her own way or own time; a learner who is in control of his or her own experience is likely to learn the most' (p.81).

Further accentuating this distancing from traditional means, Schank stresses the importance of moving away from futile memorisation techniques which tend to have no impact on behaviour and usually fall short of translating into learned skills. Experience through simulations is the key. This point has been echoed by a number of researchers (Merrill, 1997; Whitlock, 2001) who state that if an instructional strategy does not include presentation, practice and learning guidance consistent with the knowledge or skill to be taught then it will not teach.

Similar to Schank's approach, research put forward by Clark and Mayer (2003) also recommend prioritising the design focus on the learning process rather than the programme content itself. As a first step they urge designers to acquire a deeper insight into the thought structure of their end-users by first grasping a thorough understanding of the cognitive process of the student's mind. They suggest designing programmes specifically to 'guide the learner's transformation of words and pictures in the lesson through the sensory and working memories so that they get incorporated into the existing knowledge in long-term memory' (p.36); a total of five processes must occur for this to take place.

The first of these involves the selection of important information in the lesson. Designers must therefore be sure to direct users towards recognising the more crucial points of interest through the use of prominent arrows, colours, fonts and visual aids. When using visual materials however, designers must also ensure that pictures and words appear in close proximity in order to help promote better integration between text, graphics and prior existing knowledge thus allowing the student to store data in integrated blocks rather than compartmentalised sections.

In regards to short-term or working memory, course designers must be careful not overload the student with excessive information when documenting material pertaining to linear subjects such as mathematics. Asking students to retrieve large quantities of data prior to moving on to the next paragraph or chapter often causes a breakdown in the learning process. This is due to the limited capacity of working memory, a point which designers must take heed of when inserting visual aids or background sounds or music. Less is sometimes more and in such situations a minimalist approach often garners the best results with working memory exposed only to that which is vitally important.

Lastly, Clarke and Mayer also stress the importance of catering for students with low meta-cognitive ability who may have not yet developed the study habits and learning awareness of their more senior counterparts. This can be achieved through continuous goal-setting and active monitoring of student activity. This is usually an element which course designers fail to incorporate in their programmes.

Merrill (1997), from his 20 years of experience in the field, has outlined a number of key design elements that help define a quality course designer. Among these he emphasises vital talents such as understanding how people learn, writing aims and objectives, task analysis, media selection, subject matter research, questioning techniques and storyboarding which his findings suggest constitute the required abilities needed to meet the recommended criteria for good course design. This includes a list of reoccurring elements compiled from surveys conducted by Merrill himself in which course participants have documented what they feel help define a well-designed programme. The top few include clearly specified objectives, attractive presentation, clear signposting, a variety of questions and problems, modular structure, appropriate language and feedback on progress (Whitlock, 2001). These however only make for general guidelines. As discussed earlier, there exists no one best-fit model or approach to instructional design, this, as highlighted by Shaw (2001), makes for perhaps the single most important directive for online course development. Programme effectiveness is best gauged by the degree of which course design is suited to educational requirements.

Where online learning is used merely in a supportive role, Thalheimer (2003) lists the benefits of these systems and suggests various ways in which the unique strengths of e-Learning can be blended with other types of learning. Among them he mentions the ability to 'provide information and pre-questions prior to the primary learning events; to provide reminders and practice in realistic decision making after the primary learning events; to encourage learners to communicate through online threaded discussions or synchronous sessions during and after the primary learning events; to give learners opportunities to ask questions and get feedback from instructors or experts and to allow designers to, instead of creating one long program, create shorter versions that return to the same concepts in engaging ways' (Thalheimer, 2003; p.4). These suggestions, he stresses, are 'especially beneficial when utilised to improve classroom training which typically suffers from a lack of spaced repetitions and a lack of meaningful decision-making practice' (loc cit). This blended model is also more likely to be supported in terms of expenditure, particularly with regards to tertiary education where development costs often far exceed those at the primary or secondary level.

THE FUTURE OF E-LEARNING

E-Learning expert Downes (1998) envisages a future where 'education will be less class-based and much more topic-based'. He foresees an environment where 'Educational Delivery' technology can be utilised allowing topics to be picked based on student interest, student aptitude and educational level. He states that 'a student's daily menu will be varied and constantly changing, building on each day's achievement…people will log in to class, and like selecting a channel, will enter a game or simulation at their own level and pacing…they will be joined by other learners attempting the same 'quest' at the same level'.

In regards to the specifics of course design, the study suggests three major templates which course designers will be likely to adopt in the near future. The first of these, the Bells and Whistles Approach, emphasises heavily on interactivity and usually involves hefty start-up costs and considerable use of new technology.

The second termed online 'archival' technology, a more cost-effective medium, may provide a better alternative. Cheaper and more flexible, this model enables instructors to set assignments that 'rely on class simulations and/or archival databases of information. Students can then refer to these resources to complete homework, solve class projects or even study for exams. The emphasis here is on teachers designing challenging online homework assignments rather than on having technology respond to predicted instructional circumstances and outcomes' (loc cit; p.3). Such a course may incorporate placing the student in a virtual corporate boardroom where he/she is asked to resolve the company's pending production problems for example. This would involve accessing information available in the course database such as factory visit simulations, interview simulations with managers and compiled statistical data to allow the student to individually decipher and solve the problem at hand. The difficulty with this model however, is that although cheaper than the 'Bells and Whistles Approach' archival courses still involve considerable start up costs and are resistant to change.

A viable solution to both issues above may involve a more straightforward approach to course design. The University of Phoenix, relied on simpler technologies to support small classes which emphasise more on interaction, writing, and application. Emphasis is more on inter-student correspondence through the use of present-day technologies such as e-mail and online threaded discussions. Lectures are transcribed to text files while basic interactive simulations are used to reinforce classroom concepts. The model involves little or no administrative involvement at the design stage and is also more adaptable to alterations and add-ons.

The rapid expansion of bandwidth and overall progression in Internet speed and connectivity will soon allow all-in-one networks to make sending and receiving class interactions, course materials and events, in any medium, as simple as it is now to talk on a wireless phone. Despite its many potential benefits however, the actual effectiveness of wireless education will be entirely dependent on its implementation and use by both students and educators. Forecasting efforts can be particularly difficult with regards to educational products as 'rarely are technologies used in e-Learning developed specifically for the learning community' (Blinco, 2004; p.3).

Developing a succinct perspectives or future scenarios is therefore far from easy, often prompting highly differing opinions amongst designers. The Institute for the Future (IFTF) in 2001 commissioned a group of global educational experts to put together four such scenarios based on their collective views on what e-education might look like in the year 2010. Although merely speculative, it provides an intriguing insight into the outlook of those on the very periphery of technological development.

The first of these, the "New Tools, Old Schools" view, envisages a future where "cheap, pervasive connectivity and devices fail to produce relevant, pedagogically sound e-education" (IFTF, 2001; p.8) and where "learning remains teacher-centric in the classroom" (loc cit).

The second scenario also "presupposes pervasive technology and stalling of e-education pedagogy but assumes a multi-modal approach to learning. In and outside of classrooms, there is emphasis on communities of practice, mentors, experiential learning and relationship between the real and virtual world but generally students and teachers must cobble together their own curriculum to navigate a highly polluted and poorly mapped sea of information" (loc cit).

Scenario number three purports the concept of seamless connectivity where access to broadband will be pervasive with solid e-educational technology and software. It paints a perhaps idealistic view where "teaching and learning mesh into a single multi-dimensional experience, in sync with networked culture in which the languages, values, and ideas of different cultures will be exchanged, translated and mutually understood for all but a few remote unconnected areas which are the recipients of volunteer and charitable non-profit organisations. Without such contributions however, the idea of not being connected to the system represents a clear problem and may even result in certain social implications such as those addressed in the fourth scenario.

Referred to as the "It's a Small World (If you're 'On')" model, this perspective describes a future where "access to broadband will be spotty but e-education will progress. Those in connected areas will become part of the global networked society united by technological access to ideas and a multi-dimensional learning approach. Those who are off the grid will be separated not only from the global network but also are likely to feel different from people in their own countries who are 'always on'" (loc cit), to the point where 'the digital divide becomes a cultural chasm' (loc cit; p.9). Though far-fetched the scenario does provide an interesting perspective highlighting the often-neglected social impact of e-Learning development.

What remains to be seen, however, is the extent to which institutions will be motivated or are able to invest the time and money necessary to engage in high-quality research on the effectiveness of e-Learning. In what ways will these institutions support e-Learning advancements which can ultimately be proven to be *pedagogically effective!*

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